

Abstract

An apparatus for moving a stream of molten metal in a bath of molten metal having a pumping member, a pump housing, a power device, a connecting element to connect the power device to drive the pumping member in motion, and a shielding element rotatably mounted on the pump housing and drivingly connected to pumping member . The connecting element comprises a pumping shaft having an upper end connected to the power device, and a lower end drivingly connected to the shielding element to rotate the pumping member when the power device is actuated. The shaft and the shielding element have a first and a second coefficient of thermal expansion, respectively. The shaft is telescopically disposed in the shielding element out of contact with the molten metal and formed a chamber between the shaft and the shielding element sufficient to permit thermal expansion of the shaft without imposing a radial thermal stress on the shielding element. There is also a secondary connecting element that connects the shielding element to the shaft such that the shielding element and all its internal components rotate with the shaft as a single unit.

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